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Terms	Documents
violaxanthin and epoxidase	15

Database: US Pre-Grant Publication Full-Text Database; US Patents Full-Text Database; US OCR Full-Text Database; EPO Abstracts Database; JPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

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L1	violaxanthin and epoxidase	4	L1

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NEWS	3	JAN 27	Source of Registration (SR) information in REGISTRY updated and searchable
NEWS	4	JAN 27	A new search aid, the Company Name Thesaurus, available in CA/CAplus
NEWS	5	FEB 05	German (DE) application and patent publication number format changes
NEWS	6	MAR 03	MEDLINE and LMEDLINE reloaded
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NEWS	14	APR 26	LITALERT now available on STN
NEWS	15	APR 27	NLDB: New search and display fields available
NEWS	16	May 10	PROUSDDR now available on STN
NEWS	17	May 19	PROUSDDR: One FREE connect hour, per account, in both May and June 2004
NEWS	18	May 12	EXTEND option available in structure searching
NEWS	19	May 12	Polymer links for the POLYLINK command completed in REGISTRY
NEWS	20	May 17	FRFULL now available on STN

NEWS EXPRESS	MARCH 31 CURRENT WINDOWS VERSION IS V7.00A, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 26 APRIL 2004
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L2           20 DUPLICATE REMOVE L1 (17 DUPLICATES REMOVED)

=> d l2 1-20 ti

L2   ANSWER 1 OF 20  CAPLUS  COPYRIGHT 2004 ACS on STN
TI   Carotenoid Specificity of Light-harvesting Complex II Binding Sites:
     Occurrence of 9-cis-violaxanthin in the neoxanthin-binding site in the
     parasitic angiosperm Cuscuta reflexa

L2   ANSWER 2 OF 20  BIOSIS  COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
     DUPLICATE 1
TI   Significance of the lipid phase in the dynamics and functions of the
     xanthophyll cycle as revealed by PsbS overexpression in tobacco and
     in-vitro de-epoxidation in monogalactosyldiacylglycerol micelles.

L2   ANSWER 3 OF 20  BIOSIS  COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
     DUPLICATE 2
TI   Expression of xanthophyll biosynthetic genes during light-dependent
     chloroplast differentiation.

L2   ANSWER 4 OF 20  BIOSIS  COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI   Changes in violaxanthin deepoxidase activity and unsaturation of thylakoid
     membrane lipids in indica and japonica rice under chilling condition and
     strong light.

L2   ANSWER 5 OF 20  BIOSIS  COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
     DUPLICATE 3
TI   Expression of vde gene integrated into tobacco genome in
     antisense and overexpressed ways.

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     DUPLICATE 4
TI   Dynamics of chromophore binding to Lhc proteins in vivo and in vitro
     during operation of the xanthophyll cycle.

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     (2004) on STN                                        DUPLICATE 5
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TI Overexpression of violaxanthin de-epoxidase: properties of C-terminal deletions on activity and pH-dependent lipid binding.

L2 ANSWER 8 OF 20 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
TI The de-epoxidase and epoxidase reactions of Mantoniella squamata (Prasinophyceae) exhibit different substrate-specific reaction kinetics compared to spinach.

L2 ANSWER 9 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI Enzymes and mechanisms for violaxanthin-**zeaxanthin** conversion

L2 ANSWER 10 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN DUPLICATE 7
TI Suppression of **zeaxanthin** formation does not reduce photosynthesis and growth of transgenic tobacco under field conditions.

L2 ANSWER 11 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Overexpression of violaxanthin de-epoxidase from Spinacia oleracea in Escherichia coli.

L2 ANSWER 12 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI **Plant VDE** genes and methods related thereto.

L2 ANSWER 13 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI A vitamin C-deficient Arabidopsis mutant shows lower nonphotochemical quenching.

L2 ANSWER 14 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN DUPLICATE 8
TI Antisense suppression of violaxanthin de-epoxidase in tobacco does not affect **plant** performance in controlled growth conditions.

L2 ANSWER 15 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN DUPLICATE 9
TI Substrate specificity and functional aspects of violaxanthin-de-epoxidase, an enzyme of the xanthophyll cycle.

L2 ANSWER 16 OF 20 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 10
TI Developmental expression of violaxanthin de-epoxidase in leaves of tobacco growing under high and low light.

L2 ANSWER 17 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Reaction system for violaxanthin de-epoxidase with PSII membranes.

L2 ANSWER 18 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI **Plant** violaxanthin deepoxidase gene **vde**, cDNA sequences, and genetic engineering to regulate **zeaxanthin** or antheraxanthin levels and **plant** sensitivity to light

L2 ANSWER 19 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
TI Purification and properties of violaxanthin de-epoxidase from spinach.

L2 ANSWER 20 OF 20 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 11
TI Molecular cloning of violaxathin de-epoxidase from romaine lettuce and expression in Escherichia coli.

=> d 5 7 10 12 14 15 ibib ab

L2 ANSWER 5 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
DUPLICATE 3
ACCESSION NUMBER: 2003:465927 BIOSIS
DOCUMENT NUMBER: PREV200300465927
TITLE: Expression of **vde** gene integrated into tobacco genome in antisense and overexpressed ways.
AUTHOR(S): Deng, Ying [Reprint Author]; Lin, Rong-Cheng [Reprint Author]; Jing, Yu-Xiang [Reprint Author]; Wang, Qiang [Reprint Author]; Li, Liang-Bi [Reprint Author]; Liu, Bo-Lin [Reprint Author]; Kuang, Ting-Yun [Reprint Author]
CORPORATE SOURCE: Photosynthesis Research Center, Institute of Botany, Chinese Academy of Sciences, Beijing, 100093, China lbli@ns.ibcas.ac.cn; kuangty@ns.ibcas.ac.cn
SOURCE: Photosynthetica (Prague), (2003) Vol. 41, No. 1, pp. 137-141. print.
CODEN: PHSYB5. ISSN: 0300-3604.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 8 Oct 2003
Last Updated on STN: 8 Oct 2003
AB Violaxanthin de-epoxidase (**VDE**) is localised in the thylakoid lumen of chloroplasts and catalyses de-epoxidation of violaxanthin into antheraxanthin and **zeaxanthin**. Tobacco **vde** gene was inserted into a binary vector pCAMBIA1301 with the hygromycin resistant gene for selection in antisense and overexpressed ways. Two constructs with antisense and overexpressed **vde** gene were introduced in tobacco (Nicotiana tabacum L.) using Agrobacterium tumefaciens strain LBA4404. PCR and Southern blot analyses demonstrated that the exogenous gene was integrated into genome of tobacco **plants**. **VDE** activity assay and HPLC analysis of pigments showed that the **vde** gene was expressed in the overexpressed transformants, whereas suppressed in the antisense ones. The chlorophyll fluorescence measurements proved that the contents of **VDE** in transgenic **plants** have a significant function in non-photochemical quenching.

L2 ANSWER 7 OF 20 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
ACCESSION NUMBER: 2002:39446 AGRICOLA
DOCUMENT NUMBER: IND23272700
TITLE: Overexpression of violaxanthin de-epoxidase: properties of C-terminal deletions on activity and pH-dependent lipid binding.
AUTHOR(S): Hieber, A.D.; Bugos, R.C.; Verhoeven, A.S.; Yamamoto, H.Y.
AVAILABILITY: DNAL (450 P693)
SOURCE: Planta, Jan 2002. Vol. 214, No. 3. p. 476-483
Publisher: Berlin ; New York : Springer-Verlag, 1925-
CODEN: PLANAB; ISSN: 0032-0935
NOTE: Includes references
PUB. COUNTRY: Germany
DOCUMENT TYPE: Article
FILE SEGMENT: Non-U.S. Imprint other than FAO
LANGUAGE: English
AB Violaxanthin de-epoxidase (**VDE**) is localized in the thylakoid lumen and catalyzes the de-epoxidation of violaxanthin to form antheraxanthin and **zeaxanthin**. **VDE** is predicted to be a lipocalin protein with a central barrel structure flanked by a cysteine-rich N-terminal domain and a glutamate-rich C-terminal domain. A

full-length Arabidopsis thaliana (L.) Heynh. **VDE** and deletion mutants of the N- and C-terminal regions were expressed in Escherichia coli and tobacco (Nicotiana tabacum L. cv. Xanthi) **plants**. High expression of **VDE** in E. coli was achieved after adding the argU gene that encodes the E. coli arginine AGA tRNA. However, the specific activity of **VDE** expressed in E. coli was low, possibly due to incorrect folding. Removal of just 4 amino acids from the N-terminal region abolished all **VDE** activity whereas 71 C-terminal amino acids could be removed without affecting activity. The difficulties with expression in E. coli were overcome by expressing the Arabidopsis **VDE** in tobacco. The transformed tobacco exhibited a 13- to 19-fold increase in **VDE** specific activity, indicating correct protein folding. These **plants** also demonstrated an increase in the initial rate of non-photochemical quenching consistent with an increased initial rate of de-epoxidation. Deletion mutations of the C-terminal region suggest that this region is important for binding of **VDE** to the thylakoid membrane. Accordingly, in vitro lipid-micelle binding experiments identified a region of 12 amino acids that is potentially part of a membrane-binding domain. The transformed tobacco **plants** are the first reported example of **plants** with an increased level of **VDE** activity.

L2 ANSWER 10 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
DUPLICATE 7

ACCESSION NUMBER: 2001:354931 BIOSIS
DOCUMENT NUMBER: PREV200100354931
TITLE: Suppression of **zeaxanthin** formation does not reduce photosynthesis and growth of transgenic tobacco under field conditions.
AUTHOR(S): Sun, Wen-Hao; Verhoeven, Amy S.; Bugos, Robert C.; Yamamoto, Harry Y. [Reprint author]
CORPORATE SOURCE: Department of Molecular Biosciences and Biosystems Engineering, University of Hawaii at Manoa, 1955 East West Road, Ag Sci 218, Honolulu, HI, 96822, USA yamamoto@hawaii.edu
SOURCE: Photosynthesis Research, (2001) Vol. 67, No. 1-2, pp. 41-50. print.
CODEN: PHRSDI. ISSN: 0166-8595.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 2 Aug 2001
Last Updated on STN: 19 Feb 2002

AB Tobacco (Nicotiana tabacum cv. Xanthi) transformed with an antisense cDNA construct of violaxanthin de-epoxidase (**VDE**) was examined for the effects of suppressed xanthophyll-cycle activity on photoinhibition, photosynthesis and growth under field conditions. De-epoxidation of violaxanthin and non-photochemical quenching were highly inhibited in antisense **plants** relative to vector-control and wild-type **plants**. However, no differences were observed between antisense and control **plants** in photosynthetic CO2 uptake and maximum photochemical yield ((Fm-Fo)/Fm) measured at predawn or in actual photochemical yield ((Fm'-Fs)/Fm') measured at midday. Moreover, growth rates of the **plants** were the same, as were the leaf area ratio, **plant** height and leaf number. Similarly, antisense **plants** did not exhibit greater susceptibility to photoinhibition than controls under field conditions. In contrast, when chloroplast protein (D1) synthesis was inhibited by lincomycin, antisense **plants** were more vulnerable to photoinhibition than wild-type **plants**. These results indicate that photoprotection under field conditions is not strictly dependent on the levels of the de-epoxidized xanthophylls, antheraxanthin and **zeaxanthin**.

L2 ANSWER 12 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
ACCESSION NUMBER: 2000:324223 BIOSIS

DOCUMENT NUMBER: PREV200000324223
TITLE: **Plant VDE** genes and methods related thereto.
AUTHOR(S): Yamamoto, Harry Y. [Inventor, Reprint author]; Bugos, Robert C. [Inventor]; Rockholm, David C. [Inventor]
CORPORATE SOURCE: Honolulu, HI, USA
ASSIGNEE: Calgene LLC
PATENT INFORMATION: US 6015939 January 18, 2000
SOURCE: Official Gazette of the United States Patent and Trademark Office Patents, (Jan. 18, 2000) Vol. 1230, No. 3. e-file.
CODEN: OGUPE7. ISSN: 0098-1133.
DOCUMENT TYPE: Patent
LANGUAGE: English
ENTRY DATE: Entered STN: 2 Aug 2000
Last Updated on STN: 7 Jan 2002

AB DNA sequences encoding **plant vde** enzymes are provided herein. The sequences may be joined to heterologous DNA sequences for use as probes and in DNA constructs to modify the genotype of a host organism. DNA constructs and methods are provided to modify a host cell phenotype by altering the amount of photoprotection enzyme present in the host cell. In plastid containing host cells, **zeaxanthin** levels and sensitivity to light can be modified through alterations in the level of **vde** enzymes.

L2 ANSWER 14 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
DUPLICATE 8
ACCESSION NUMBER: 2001:92859 BIOSIS
DOCUMENT NUMBER: PREV200100092859
TITLE: Antisense suppression of violaxanthin de-epoxidase in tobacco does not affect **plant** performance in controlled growth conditions.
AUTHOR(S): Chang, Sue-Hwei; Bugos, Robert C.; Sun, Wen-Hao; Yamamoto, Harry Y. [Reprint author]
CORPORATE SOURCE: Department of Molecular Biosciences and Biosystems Engineering, University of Hawaii-Manoa, 1955 East West Road, Room 218, Honolulu, HI, 96822, USA
yamamoto@hawaii.edu
SOURCE: Photosynthesis Research, (2000) Vol. 64, No. 1, pp. 95-103. print.
CODEN: PHRSDI. ISSN: 0166-8595.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 21 Feb 2001
Last Updated on STN: 12 Feb 2002

AB Violaxanthin de-epoxidase (**VDE**) catalyzes the de-epoxidation of violaxanthin to antheraxanthin and **zeaxanthin** in the xanthophyll cycle. Tobacco was transformed with an antisense **VDE** construct under control of the cauliflower mosaic virus 35S promoter to determine the effect of reduced levels of **VDE** on **plant** growth. Screening of 40 independent transformants revealed 18 antisense lines with reduced levels of **VDE** activity with two in particular (TAS32 and TAS39) having greater than 95% reduction in **VDE** activity. Northern analysis demonstrated that these transformants had greatly suppressed levels of **VDE** mRNA. De-epoxidation of violaxanthin was inhibited to such an extent that no **zeaxanthin** and only very low levels of antheraxanthin could be detected after exposure of leaves to high light (2000 mumol m-2 s-1 for 20 min) with no observable effect on levels of other carotenoids and chlorophyll. Non-photochemical quenching was greatly reduced in the antisense **VDE** tobacco, demonstrating that a significant level of the non-photochemical quenching in tobacco requires de-epoxidation of violaxanthin. Although the antisense **plants** demonstrated a greatly impaired de-epoxidation of violaxanthin, no effect on **plant** growth or photosynthetic rate was found when **plants** were grown at a photon flux density of 500

or 1000 mumol m-2 s-1 under controlled growth conditions as compared to wild-type tobacco.

L2 ANSWER 15 OF 20 BIOSIS COPYRIGHT 2004 BIOLOGICAL ABSTRACTS INC. on STN
DUPLICATE 9

ACCESSION NUMBER: 1999:310616 BIOSIS
DOCUMENT NUMBER: PREV199900310616
TITLE: Substrate specificity and functional aspects of violaxanthin-de-epoxidase, an enzyme of the xanthophyll cycle.
AUTHOR(S): Grotz, B.; Molnar, P.; Stransky, H.; Hager, A. [Reprint author]
CORPORATE SOURCE: Botanisches Institut, Universitaet Tuebingen, Auf der Morgenstelle 1, D-72076, Tuebingen, Germany
SOURCE: Journal of Plant Physiology, (April, 1999) Vol. 154, No. 4, pp. 437-446. print.
CODEN: JPPHEY. ISSN: 0176-1617.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 17 Aug 1999
Last Updated on STN: 17 Aug 1999

AB The fast light-dependent xanthophyll transformations ("xanthophyll-cycle") in thylakoids of green **plants** are catalysed by two enzymes: the strictly pH controlled and ascorbate-dependent (violaxanthin)-de-epoxidase (**VDE**) and the NADPH2- and O2-dependent (**zeaxanthin**)-epoxidase. The substrate specificity of the **VDE** was studied by using structurally different epoxy-xanthophylls. For this purpose the enzyme was isolated by a freeze-thaw treatment of thylakoid-vesicles of spinach at pH 7.5 and incubated with various epoxy-substrates in the presence of the cosubstrate and a lipid factor (phosphatidylcholine) at pH 5.2. Under these conditions the Km-value for the substrate violaxanthin (Vio) was 11.1 mumol/L and for antheraxanthin (Ant) 5.3 mumol/L. Only the epoxy-oxygen at the 5,6 (5',6') position of xanthophylls was cleaved by the **VDE**, whereas ring-spanning epoxides at position 3,6 (3',6') were not accessible to the enzyme. Moreover, the structure and chemical ligands of the second jonon ring were insignificant for the de-epoxidation of the 5,6-epoxy-groups of the first ring. Therefore, the epoxy-free (or also epoxy-containing) second jonon ring is not involved in the binding of the xanthophyll to the catalytic center and does not affect the enzyme reaction. However, due to a steric hindrance, any tested cis-configuration in the polyene chain of the xanthophylls, as well as the 8-oxy group in fucoxanthin, prevent the deepoxidation. The epoxy-xanthophylls available for the **VDE** are suggested to occur as rod-like, trans-configurated pigments within the lipid bilayer of thylakoids. When the mobile **VDE** is bound to the lumenal side of the thylakoid at pHltoreq6.5 (Hager and Holocher, 1994), the epoxy-xanthophylls, guided by lipids, invade a fold, channel or tube-like structure of the enzyme, which functions as the catalytic center for the de-epoxidation. Functional aspects of the Vio-de-epoxidation and of the xanthophyll-cycle are discussed.